

## REMARKS

Claims 41-44, 45-52, 50, 55-58, 60-66, 69-80, 83-94, 88-90, 92, and 97-104 remain pending. New Claims 105-113 have been added which reflect limitation of now canceled original Claims 39, 40, 53, 54, 67, 68, 81, 82, 95 and 96, respectively, including amendments that are consistent with those amendments which have been made in pending claims.

The Examiner has cited U.S. Patent 5,941,307 issued to Tubel as prior art under 35 U.S.C. § 102(e). It is believed that Tubel can be removed as prior art, at least as to some of the claims, by swearing behind the reference, as allowed under 37 C.F.R. 1.131. However, Applicant believes that the present invention is patentably distinct over Tubel and therefore, for the purpose of this response, the Tubel reference will be discussed.

### The § 102 Rejections

The Examiner rejected Claims 41-52, 55-66, 69-80, and 83-104 under 35 U.S.C. § 102(e) as being anticipated by Tubel. Applicant respectfully disagrees in view of the amendments made above, as will be further discussed below.

Initially, it is noted that independent Claims 41-44, 46-48, 50, 55-58, 60-62, 64, 69-72, 74-76, 78, 83-86, 88-90, 92, 97, 99, 101 and 103 have been amended in a way which requires that the portable device is configured for movement by an individual operator of the device. In this regard, it is submitted that Tubel fails to teach, disclose or reasonably suggest such a portable device. The Examiner has relied on Tubel with reference to a remote central control center 10, that is shown in Figure 1 of Tubel. This item appears to Applicant to be a permanent structure having a satellite dish on its roof. Clearly, buildings are not movable by an individual operator, for example, in the manner of a hand-carried device. Moreover, nothing in Figure 1 of Tubel appears to be movable during operational use by an individual operator. Accordingly, it is submitted that each of these independent claims is allowable over Tubel for this reason standing on its own.

In addition to the foregoing, it is submitted that Tubel does not meet the claimed combination for another important reason. Specifically, Tubel is directed to a downhole production well system using offshore platforms. The system of Tubel is installed in preexisting wells. Moreover, Tubel is concerned with monitoring production, rather than the installation of the monitoring system itself, as it is being installed. In contrast, each of the independent claims under consideration requires that the portable device is used in conjunction with a drill rig and boring tool. Clearly, Tubel fails to teach, disclose or reasonably suggest the use of his system with at least one of a drill rig, a utility to be installed and boring tool, as is required by each of the independent claims under consideration. For these reasons standing alone, it is submitted that each of Claims 41-44, 46-48, 50, 55-58, 60-62, 64, 69-72, 74-76, 78, 83-86, 88-90, 92, 97, 99, 101 and 103 are clearly allowable over Tubel. Accordingly, allowance of these claims is respectfully requested over the art of record. Still further compelling reasons will be given below with respect to specific features of individual ones of these independent claims.

In addition to the foregoing reasons which favor the patentability of independent Claim 42 over Tubel, Claim 42 further requires that the portable locator includes a locating section for receiving a locating signal that is transmitted by the boring tool for use in identifying the underground position of the boring tool. Applicant is unable to find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 43 over Tubel, Claim 43 further requires the use of a push force sensing arrangement which generates a push force signal for inclusion as at least a portion of the data signal. Applicant is unable to find this feature in Tubel.

Dependent Claim 45 is directly dependent from and therefore includes the limitations of Claim 44. Accordingly, it is respectfully submitted that Claim 45 is also patentable over the art of record for at least the reasons set forth above with respect to Claim 44. Further, Claim 45 places additional limitations on Claim 44 which, when considered in its light, further distinguish the claimed invention from the art of record.

In addition to the foregoing reasons which favor the patentability of independent Claim 46 over Tubel, this claim requires that the operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value. The portable device is then configured for issuing a warning that the predetermined value has been violated. Applicant respectfully submits that Tubel is devoid of this feature.

In addition to the foregoing reasons which favor the patentability of independent Claim 47 over Tubel, this claim requires that the operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool may be damaged and the detection arrangement produces the data signal responsive to exceeding the maximum push value. The portable device is configured to provide an indication of violation of the maximum push value when the maximum push value is exceeded. Applicant is unable to find this combination of features in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 48 over Tubel, this claim requires that the operational parameter is a status of drilling mud for inclusion as at least a portion of the data signal. Applicant is unable to find any reasonable teaching of this feature in Tubel. Again, Tubel teaches a production well monitoring system that is unrelated to drilling. For this reason alone, it is submitted that Claim 49 is allowable over Tubel.

Dependent Claim 49 is directly dependent from and therefore includes the limitations of Claim 48. Accordingly, it is respectfully submitted Claim 49 is also patentable over the art of record for at least the reasons set forth above with respect to Claim 48. Further, Claim 49 places additional limitations on Claim 48 which, when considered in its light, further distinguish the claimed invention from the art of record. For example, Applicant is unable to find any teaching in Tubel with relating to providing a warning with respect to drilling mud, as is required by Claim 49.

In addition to the foregoing reasons which favor the patentability of independent Claim 50 over Tubel, this claim requires that the detection arrangement at the drill rig includes a drill path monitoring arrangement for monitoring curvature of the underground bore being formed by the boring tool as the operational parameter and for comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility, to be installed, with the curvature of the underground bore to form at least a portion of the data signal. Accordingly, it is submitted that Claim 50 is allowable over Tubel.

Dependent Claims 51 and 52 are each either directly or indirectly dependent from and therefore include the limitations of Claim 50. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the

reasons set forth above with respect to Claim 50. Further, each of these dependent claims places additional limitations on their parent and intermediate claims which, when considered in light of Claim 50, further distinguish the claimed invention from the art of record.

For example, Claim 51 recites indicating that a selected minimum bend radius of either the drill string or a utility to be installed is violated. Claim 52 further recites that the selected minimum bend radius is the greater one exhibited by the drill string and utility to be installed.

In addition to the foregoing reasons which favor the patentability of independent Claim 56 over Tubel, this claim requires that the boring tool includes a locating signal transmitter which transmits a locating signal for locating an underground position of the boring tool. The portable device additionally is configured for receiving the locating signal for use in identifying the underground position of the boring tool. Applicants do not find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 57 over Tubel, this claim requires that the operational parameter is push force which is sensed to produce a push force signal for inclusion in the data signal. Applicant does not find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 58 over Tubel, this claim requires that the operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value and transmitting to the portable locator, as at least a portion of the data signal, a warning that the selected predetermined value has been violated. Applicant submits that Tubel fails to teach this feature.

Dependent Claim 59 is directly dependent from and therefore include the limitations of Claim 58. Accordingly, it is respectfully submitted that Claim 59 is also patentable over the art of record for at least the reasons set forth above with respect to Claim 58. Further, Claim 59 places additional limitations on Claim 58 which, when considered in its light, further distinguish the claimed invention from the art of record.

In addition to the foregoing reasons which favor the patentability of independent Claim 60 over Tubel, this claim requires that the operational parameter is monitored using a detection arrangement at the drill rig and the operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value. The data signal, relating to the operational parameter, is transferred to a portable device which issues a warning that the selected predetermined value has been violated. Applicant submits that Tubel fails to teach this feature.

In addition to the foregoing reasons which favor the patentability of independent Claim 61 over Tubel, this claim requires monitoring a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool will be damaged. A data signal, including the push force, is transferred to a portable device for use by the portable device responsive to violation of the maximum push value when the maximum push value is exceeded. Applicant is unable to find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 62 over Tubel, this claim requires monitoring at least one operational parameter as a status of the drilling mud for inclusion as at least a portion of the data signal.

Applicant is unable to find this feature in Tubel.

Dependent Claim 63 is directly dependent from and therefore includes the limitations of Claim 62. Accordingly, it is respectfully submitted that this claim is also patentable over the art of record for at least the reasons set forth above with respect to Claim 62. Further, Claim 63 places additional limitations on Claim 62 which, when considered in its light, further distinguish the claimed invention from the art of record. For example, Applicant is unable to find any teaching in Tubel with respect to monitoring drilling mud, as is required by Claim 63. Again, Tubel teaches a production well monitoring system that is unrelated to drilling. For this reason alone, it is submitted that Claim 63 is allowable over Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 64 over Tubel, this claim requires that the boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius. An operational parameter is monitored as curvature of the underground bore being formed by the boring tool. At least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility is compared with the curvature of the underground bore to form at least a portion of the data signal. Applicant is unable to find this feature in Tubel.

Dependent Claims 65 and 66 are each directly dependent from and therefore include the limitations of Claim 64. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the reasons set forth above with respect to Claim 64. Further, each of these dependent claims places additional limitations on Claim 64 which, when considered in its light, further distinguish the claimed invention from the art of record.

For example, Claim 65 recites indicating that a selected minimum bend radius of either the drill string or a utility that is to be installed is violated. Claim 66 further recites that the selected minimum bend radius is the greater one exhibited by the drill string and utility to be installed.

In addition to the foregoing reasons which favor the patentability of independent Claim 69 over Tubel, this claim requires an arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool. A portable device includes a display arrangement configured for using the data signal for display to an operator of the portable device. Applicant is unable to find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 70 over Tubel, Claim 70 requires a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool. A portable device includes a locating section for receiving a locating signal for use in identifying the underground position of the boring tool and a communication arrangement transfers the data signal from the detection arrangement to the portable device. Applicant does not find this combination of features in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 71 over Tubel, Claim 71 includes a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and the

drilling system includes a drill string extending from the drill rig to the boring tool configured for receiving a push force applied by the drill rig to move the boring tool in a forward direction. A monitoring arrangement includes a detection arrangement for monitoring the push force to generate a push force signal for inclusion as at least a portion of the data signal. Applicant does not find this feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 72 over Tubel, Claim 72 requires that the operational parameter is capable of violating at least a selected one of a minimum and maximum predetermined value and a communication arrangement transfers a data signal from the detection arrangement to the portable device and, as part of the data signal, transfers a warning to the portable device that the predetermined value has been violated. Applicant is unable to find this combination of features in Tubel.

Dependent Claim 73 is directly dependent from and therefore include the limitations of Claim 72. Accordingly, it is respectfully submitted that this claim is also patentable over the art of record for at least the reasons set forth above with respect to Claim 72. Further, Claim 73 places additional limitations on Claim 62 which, when considered in its light, further distinguish the claimed invention from the art of record.

In addition to the foregoing reasons which favor the patentability of independent Claim 74 over Tubel, Claim 74 includes limitations which reflect the limitations of Claim 72, but in apparatus form. Accordingly, it is respectfully submitted that that Claim 74 is also allowable with respect to those unique limitations that are shared with Claim 72, standing on their own.

In addition to the foregoing reasons which favor the patentability of independent Claim 75 over Tubel, Claim 75 further requires that the operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool may be damaged and the detection arrangement produces the data signal responsive to exceeding the maximum push value. The portable device is configured for receiving the data signal, relating to the operational parameter, for providing an indication of violation of the maximum push value when the maximum push value is exceeded. Applicant respectfully submits that this combination of limitations is not reasonably disclosed by Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 76 over Tubel, Claim 76 further requires that the operational parameter is a status of the drilling mud for inclusion as at least a portion of the data signal. Applicant is unable to find this feature in Tubel.

Dependent Claim 77 is directly dependent from and therefore includes the limitations of Claim 76. Accordingly, it is respectfully submitted that this claim is also patentable over the art of record for at least the reasons set forth above with respect to Claim 76. Further, Claim 77 places additional limitations on Claim 76 which, when considered in its light, further distinguish the claimed invention from the art of record. In particular, Applicant finds no teaching in Tubel with respect to providing a warning to an operator based on drill mud status.

In addition to the foregoing reasons which favor the patentability of independent Claim 78 over Tubel, Claim 78 further requires that the boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius. A monitoring arrangement includes a detection

arrangement for monitoring the operational parameter as curvature of the underground bore being formed by the boring tool for comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility with the curvature of the underground bore to form at least a portion of the data signal. Applicant is unable to find this feature in Tubel.

Dependent Claims 79 and 80 are each either directly or indirectly dependent from and therefore include the limitations of Claim 78. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the reasons set forth above with respect to Claim 78. Further, each of these dependent claims places additional limitations on their parent and intermediate claims which, when considered in light of Claim 78, further distinguish the claimed invention from the art of record.

For example, Claim 79 recites indicating that a selected minimum bend radius of either the drill string or a utility that is to be installed is violated. Claim 80 further recites that the selected minimum bend radius is the greater one exhibited by the drill string and utility to be installed.

In addition to the foregoing reasons which favor the patentability of independent Claim 85 over Tubel, Claim 85 further requires sensing the push force of the drill string to generate a push force signal for inclusion as at least a portion of the data signal and transferring the data signal, relating to the operational parameter, to a portable device for use thereby. Applicant respectfully submits that this feature is not disclosed by Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 86 over Tubel, Claim 86 further requires that the operational parameter is capable of violating a minimum or maximum predetermined value and sending, as at least a portion of the data signal, a warning to the portable device that the predetermined value has been violated. Applicant respectfully submits that Tubel fails to disclose this feature.

Dependent Claim 87 is directly dependent from and therefore includes the limitations of Claim 86. Accordingly, it is respectfully submitted that this claim is also patentable over the art of record for at least the reasons set forth above with respect to Claim 86. Further, Claim 87 places additional limitations on Claim 86 which, when considered in its light, further distinguish the claimed invention from the art of record.

In addition to the foregoing reasons which favor the patentability of independent Claim 88 over Tubel, Claim 88 further requires that the operational parameter is capable of violating a minimum or maximum predetermined value and a data signal is transferred, relating to the operational parameter, to a portable device, for use by the portable device. Thereafter, a warning is issued, using the portable device, that the selected predetermined value has been violated. Applicant respectfully submits that Tubel is devoid of this feature.

In addition to the foregoing reasons which favor the patentability of independent Claim 89, Claim 89 further requires that the operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool will be damaged. The data signal, relating to the operational parameter, is transferred to a portable device for use by the portable device responsive to violation of the maximum push value when the maximum push value is exceeded. Applicant respectfully submits that Tubel fails to teach this feature.

In addition to the foregoing reasons which favor the patentability of independent Claim 90, Claim 90 further requires that the operational parameter is a status of the drilling mud for inclusion as at least a portion of the data signal for transfer to and use by the portable device. Applicant respectfully submits that Tubel fails to teach this feature.

Dependent Claim 91 is directly dependent from and therefore includes the limitations of Claim 90. Accordingly, it is respectfully submitted that this claim is also patentable over the art of record for at least the reasons set forth above with respect to Claim 90. Further, Claim 91 places additional limitations on Claim 90 which, when considered in its light, further distinguish the claimed invention from the art of record. Specifically, Applicant finds no teaching in Tubel with respect to providing a warning to an operator based on drill mud status.

In addition to the foregoing reasons which favor the patentability of independent Claim 92, Claim 92 further requires that the boring tool is attached to and moved by a drill string having one minimum bend radius and a utility to be installed includes another minimum bend radius. The operational parameter is selected as curvature of the underground bore being formed by the boring tool. At least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility is compared with the curvature of the underground bore to form at least a portion of the data signal for transfer to and use by the portable device. Applicant respectfully submits that this feature is not reasonably disclosed by Tubel.

Dependent Claims 93 and 94 are each either directly or indirectly dependent from and therefore include the limitations of Claim 92. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the reasons set forth above with respect to Claim 92. Further, each of these dependent claims places additional limitations on their parent and intermediate claims which, when considered in light of Claim 92, further distinguish the claimed invention from the art of record.

For example, Claim 93 recites indicating that a selected minimum bend radius of either the drill string or a utility to be installed is violated. Claim 80 further recites that the selected minimum bend radius is the greater one exhibited by the drill string and utility to be installed.

In addition to the foregoing reasons which favor the patentability of independent Claim 97, Claim 97 further requires that a detection arrangement is configured for detecting a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure. A portable device is configured for receiving the data signal relating to the operational parameter for use by the portable device and a communication arrangement transfers the data signal from the drill rig to the portable device. Applicant is unaware of this combination of features in the prior art and is unable to find them in Tubel.

Dependent Claim 98 is directly dependent from and therefore include the limitations of Claim 97. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the reasons set forth above with respect to Claim 97. Further, Claim 98 places additional limitations on Claim 97 which, when considered in its light, further distinguish the claimed invention from the art of record. Specifically, Claim 98 recites that the detection arrangement is further configured for detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool, a curvature of

the underground bore and a proximity of the boring tool to an underground utility. Applicant is unable to find such a highly advantageous feature in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 99 over Tubel, Claim 99 includes limitations which reflect the limitations of Claim 97, but in method form. Accordingly, it is respectfully submitted that Claim 99 is also allowable with respect to those unique limitations that are shared with Claim 97, standing on their own.

In addition to the foregoing reasons which favor the patentability of independent Claim 101 over Tubel, Claim 101 recites a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and configured for detecting a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure. A portable device is configured for receiving the data signal relating to the operational parameter for use by the portable device. A communication arrangement transfers the data signal from the detection arrangement to the portable device. Applicant is unable to find this highly advantageous combination of features in Tubel.

In addition to the foregoing reasons which favor the patentability of independent Claim 103 over Tubel, Claim 103 includes limitations which reflect the limitations of Claim 101, but in method form. Accordingly, it is respectfully submitted that Claim 103 is also allowable with respect to those unique limitations that are shared with Claim 101, standing on their own.

Dependent Claims 100, 102 and 104 are directly dependent from and therefore include the limitations of Claims 99, 101 and 103, respectively. Accordingly, it is respectfully submitted that each of these claims is also patentable over the art of record for at least the reasons set forth above with respect to their base claims. Further, these claims place additional limitations on their base claims which, considered in this light, further distinguish the claimed invention from the art of record. In particular, each of these dependent claims encompasses detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool, a curvature of the underground bore and a proximity of the boring tool to an underground utility. Applicant is unable to find this highly advantageous feature in Tubel.

New Claims 105-113 have been added, for consideration by the Examiner, which are believed by Applicant to be patentable

For the foregoing reasons, it is respectfully submitted that all of the Examiner's objections have been overcome and that the application is in condition for allowance. Hence, allowance of these claims and passage to issue of the application are solicited.

If the Examiner has any questions concerning this case, the Examiner is respectfully requested to contact Mike Pritzkau at 303-410-9254.

Respectfully submitted,



Jay R Beyer  
Reg. No. 39,907